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other names? Is it easily said? Does it tie up the bird with existing ideas? Can it be used in writing verse? Does it win the popular attention and put both the bird and name in the memories of the children and of the farmers? If it does all these, it will have back of it all the power of the genius of English to fix it, make it nation-wide and carry with it clear knowledge of the bird.

This, it seems to me, is one of the greatest needs for the spread of bird knowledge in America today.

THE REALITY OF BIRD SPECIES.

BY LEVERETT MILLS LOOMIS.

IN 1858, in volume IX of the 'Reports of Explorations and Surveys . . . from the Mississippi River to the Pacific Ocean,' *Ammodromus samuelis* Baird and *Melospiza fallax* Baird appear as full-fledged species. In 1874, in 'A History of North American Birds,' Land Birds, volume II, these so-called species are reduced in rank, being designated respectively *Melospiza melodia*, var. *samuelis*, Baird and *Melospiza melodia*, var. *fallax*, Baird. In 1886, in the first edition of the A. O. U. 'Check-List,' these names are altered, in accordance with earlier lists by Mr. Ridgway and Dr. Coues, to *Melospiza fasciata samuelis* (Baird) and *Melospiza fasciata fallax* (Baird), pure trinomials and the term subspecies having come into vogue. In 1910, in the third edition of the A. O. U. 'Check-List,' the two names are amended to *Melospiza melodia samuelis* (Baird) and *Melospiza melodia fallax* (Baird).

Owing to his lack of knowledge of geographic variation, Professor Baird gave to each of these geographic variations of the Song Sparrow an entity which they did not possess, and this entity, having gained a foothold in the literature, is perpetuated to-day in the subspecies ('incipient species'). As no one can foresee the future of these variations of the Song Sparrow, it is not known whether they are the beginnings of species or not. Nevertheless, it may be urged that bird history repeats itself, and that the

record of past events warrants the conclusion that bird species are now in process of evolution through geographic variation. Theorize as we may, the fact remains that we do not know what part geographic variation or other agencies played, or did not play, in the origin of existing bird species, the *modus operandi* of the evolution being unknown. But we do know that geographic variation is one of the common variations occurring within the bounds of a bird species of to-day, and that it is not the only variation in which geography is a factor.

Independent of individualism, age, sex, season, or climatic conditions, there exists a type of variation known as dichromatism, which perhaps originated in mutations. It is well exemplified in the Jaegers, Albatrosses and Petrels, Herons, Hawks, and Owls. In some species there is a difference in the geographic range of the phases, but it does not correlate with environment as in geographic variation. Instances to the point are found in the Wedge-tailed Shearwater, Red-tailed Hawk, and Screech Owl.

More than thirty years ago, when our knowledge of variation was far less than it is now, Dr. Stejneger had the discernment to interpret *Colaptes auratus* (Linnæus), *Colaptes cafer* (Gmelin), and *Colaptes hybridus* Baird to be dichromatic or trichromatic phases of one species, and not two species that hybridize on a gigantic scale.¹ None of the characteristics of dichromatism are wanting in these extremes and intermediates. They are similar in general character to the extremes and intermediates of well-known dichromatic species, of the Wedge-tailed Shearwater, Neglected Petrel, and Rough-legged Hawk for example. They are not individual and are not dependent upon age, sex, season, or environmental conditions. Moreover, intermediates crop out sporadically in the Eastern States, where the *auratus* phase is dominant. It is well to bear in mind that these variations of the Flicker are not greater than certain other normal variations; as the age variation of the Western Gull, the sexual variation of Williamson's Sapsucker, the seasonal variation of the Marbled Murrelet, and the dichromatic variation of the Parasitic Jaeger.

The question naturally arises, whether dichromatism has often

¹ Riverside Nat. Hist., Vol. IV, pp. 8, 9.

been misinterpreted and made the basis of apocryphal species and their supposed hybridization on a grand scale. In the alleged Junco species, for instance, possibly dichromatism or polychromatism, originating in mutations, obtains along with geographic variation.

Vermivora leucobronchialis (Brewster) and *Vermivora lawrencei* (Herrick) are not overlooked in this discussion. The evidence thus far presented tends to prove that they are hybrids between two species rather than intermediates of one dichromatic species.¹ Be this as it may, hybridization between unquestionable species of birds is an abnormal and relatively rare occurrence.

To affirm that bird species are concepts, is to ignore the facts in the case. *Ammodromus samuelis* Baird and *Melospiza fallax* Baird are concepts, but *Melospiza melodia* with all its geographic variations is a reality. It is absolutely separated from *Melospiza lincolni* and *Melospiza georgiana* and all other existing bird species. *Colaptes auratus* is likewise a reality. In spite of its great dichromatic variation, it does not intergrade with any other woodpecker. It is confidently stated that the great majority of the A. O. U. 'Check-List' species are also realities, and the remainder time-honored concepts based on inconstant variations, like *Fulmarus rodgersi* Cassin, which is merely an extreme white phase of *Fulmarus glacialis* (Linnæus).²

In a word, absence of intergradation among birds results in a definite entity, the existing bird species.

¹ Cf. Faxon, Mem. Mus. Comp. Zool., Vol. XL, 1911, pp. 57-78.

² Cf. Proc. Calif. Acad. Sci., 4th Ser., Vol. II, Pt. II, 1918, p. 88.